ABSTRACT

The present invention provides an apparatus and method for storing a particle-containing liquid. The storage apparatus comprises a microfluidic convoluted flow channel having a plurality of particle capture regions. The storage channel is preferably an isotropic spatially periodic channel. Sedimented particles can be resuspended following storage. This invention further provides a microfluidic analysis cartridge having a convoluted storage channel therein. The sample analysis can use optical, electrical, pressure sensitive, or flow sensitive detection. A plurality of analysis channels can be included in a single cartridge. The analysis channels can be joined to reagent inlets for diluents, indicators or lysing agents. A mixing channel can be positioned between the reagent inlet and the analysis region to allow mixing and reaction of the reagent. The cartridge can include additional valves and pumps for flow management. The analysis cartridge can be a self-contained disposable cartridge having an integral waste storage container. This invention further provides a sheath flow assembly. The sheath flow assembly includes a sample channel and first and second sheath fluid channels positioned on either side of and converging with the sample channel. The assembly also includes upper and lower sheath fluid chambers positioned above and below and converging with the sample channel. The flow cartridges of this invention can be formed by molding, machining or etching. In a preferred embodiment they are laminated. This invention further provides a method of fabricating a laminated microfluidic flow device. In the method, flow elements are formed in rigid sheets and abutting surfaces of the sheets are bonded together.